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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/798,347

03/12/2004

Giuseppe Rossi

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EXAMINER

DEB, ANJAN K

ART UNIT

PAPER NUMBER

2858

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<p align="center">Office Action Summary</p>	Application No. 10/798,347	Applicant(s) ROSSI ET AL.	
	Examiner Anjan K. Deb	Art Unit 2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 68-112 is/are pending in the application.
- 4a) Of the above claim(s) 70-75,95-102 and 104-112 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 68,69,76-94 and 103 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 68-112 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/29/2004, 03/12/2004</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 68, 69, 76-94, 103 drawn to method of determining temperature of an imager chip classified in class 324, subclass 71.1.
 - II. Claims 70-75, 95-102, 106-112 drawn to method of correcting temperature dependent parameter of an imager classified in class 324, subclass 721.
 - III. Claims 104, 105, drawn to method of correcting current source of an imager comprising plurality of current correction signals, classified in class 324, subclass 522.

Distinctness

2. Inventions I and II and III are directed to related imaging device methods. The related inventions are distinct if the (1) the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect; (2) the inventions do not overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants. See MPEP § 806.05(j). In the instant case, the inventions as claimed are mutually exclusive having different functions and mode of operation. As indicated above, invention I has a different function of determining temperature of an imager

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chip, and invention II has a different function of correcting temperature dependent parameter, and invention III has another different function of correcting current source of an imager. Furthermore, the inventions as claimed do not encompass overlapping subject matter and there is nothing of record to show them to be obvious variants.

Why Restriction is Proper

3. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Thomas J. D'Amico on 4/18/2007 a provisional election was made without traverse to prosecute the invention of Group I, Claims 68, 69, 76-94, 103. Affirmation of this election must be made by applicant in replying to this Office action. Claims 70-75, 95-102, 104-112 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Specification

4. The disclosure is objected to because of the following informalities: In the amendment to the specification filed 3/12/2004, page 2, insert after "2002," --now US Patent No. US 6,974,973 B2 issued December 13, 2005--

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 68, 69, 76-79, 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glukhovsky et al. (US 6,607,301) in view of Sakaue (US 4,162,411 A).

Re claims 68, 69, 76-79 Glukhovsky et al. discloses method of determining temperature of an imager chip 40 (Fig. 3)(column 4 lines 62-64), comprising, measuring a dark current value of a pixel on said chip, and determining a chip temperature representation based on said measured dark current value and stored values (known equations)(column 3, lines 51-54).

While Glukhovsky et al. discloses method (Fig. 1) of determining temperature 17 of image sensor chip 40 (Fig. 3) by obtaining dark current data 13 (column 4 lines 37-50) it did not specifically disclose storing a fabrication process dependent value for an imager chip storing at least one chip dependent value representing a measured pixel dark current reference value and a reference temperature at which said chip dependent dark current reference value was measured but would have been obvious to do so since Glukhovsky et al. suggested performing calibration (column 3 lines 51-57).

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Sakaue discloses imager chip (CCD device) wherein the amount of dark current changes due to temperature (thermal excitation) and depends on semiconductor substrate and manufacturing process of the device (column 1 lines 22-27).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify Glukhovsky et al. by storing in the imager chip a fabrication process dependent value for an imager chip storing at least one chip dependent value representing a measured pixel dark current reference value and a reference temperature at which said chip dependent dark current reference value was measured for performing calibration and accurately measuring image sensor temperature since Glukhovsky et al. disclosed performing calibration and Sakaue disclosed that the amount of dark current in imager chip (CCD device) changes due to temperature (thermal excitation) and depends on semiconductor substrate and manufacturing process of the device.

Re claim 86, Glukhovsky et al. teaches a plurality of pixels 48 (array) (Fig. 3) supplying dark current signals, which are selectively used to calculate a plurality of temperature representations, each dark current signal being associated with at least one circuit used on said imager (Figure 1, col. 4, lines 37-41, column 5 lines 1-10).

7. Claims 80-85, 87-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glukhovsky et al. (US 6,607,301) and Sakaue in view of Kono (JP402022873A).

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Re claims 80-85, 87-92, Glukhovsky et al. as modified by Sakaue disclosed all of the claimed limitations as set forth above except correcting at least one temperature dependent parameter of imager device.

Re claims 80, 81 Kono discloses temperature compensation circuit of bias circuit for imager device (photodiode) wherein a temperature dependent parameter is a current parameter which is changed by a changed amount in a dark current to compensate for changes in ambient temperature (abstract).

Re claims 82-92 while Kono disclosed controlling the current flowing in imager device (photodiode) it did not expressly disclose correcting a temperature dependent parameter comprising resistance, voltage, impedance, and capacitance. All of these parameters are considered to be obvious variants for controlling electric current flowing in the imager device by controlling impedance or the voltage as required for ambient temperature compensation in imager device (photodiode) disclosed by Kono.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify Glukhovsky et al. and Sakaue by including a circuit for correcting temperature dependent parameters in imager device including resistance, voltage, impedance, and capacitance for compensating for changes in ambient temperature and the generated dark current as disclosed by Kono for accurately measuring imager temperature.

8. Claims 93,94,103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glukhovsky et al. (US 6,607,301) and Sakaue (US 4,162,411 A) in view of Wand (US 6,267,501 B1).

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Re claims 93,94,103 Glukhovsky et al. as modified by Sakaue disclosed all of the claimed limitations as set forth in the rejection of claim 68 above including integrating unit 22 disclosed by Glukhovsky et al. (Fig. 2) and the process of collecting samples controlled by integrating unit (column 4 lines 6-36). While Glukhovsky et al. disclosed sampling is controlled by integrating unit it did not explicitly disclose sampling dark pixel signal with first and second integration time. However, sampling by variable integration is well in the art of measuring and testing routinely performed for improving signal to noise ratio of measurement signals.

Wand discloses method of calibration for measuring temperature by a detector including measuring the voltage of each pixels by varying the sampling integration time (column 4 lines 54-67) for improving signal to noise ratio of measurement signals required to accurately measure temperature.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify Glukhovsky et al. and Sakaue by modifying the integrating unit disclosed by Glukhovsky et al. for sampling dark current signal (voltage) with first and second integration time since Wand disclosed that varying the sampling integration time is beneficial for accurately measuring temperature.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Seitz (US 2003/0071196 A1) discloses imager chip (photodetector) wherein dark current depends on semiconductor process.

Tursky (US 4,744,672 A) discloses imager chip (semiconductor device having photoelectric effect) wherein temperature is monitored as a function of dark current and a temperature dependent parameter comprises resistance (dark resistance)(column 1 lines 61-68).

Hagerling (US 20040251915 A1) discloses method of measuring comprising sampling at first and second integration time for improving signal to noise ratio of measurement signals.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is 571-272-2228. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew H. Hirshfeld can be reached at (571) 272-2168.



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4/23/07